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Gary M. Nath
NATH & ASSOCIATES PLLC
112 South West Street
Alexandria, VA 22314

EXAMINER	
PUNNOOSE, ROY M	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 05/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/722,588	ALTMAN ET AL.	
	Examiner	Art Unit	
	Roy M. Punnoose	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24,27-35 and 38-50* is/are rejected.

7)☒ Claim(s) *25,26,36 and 37* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 January 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Election/Restriction

1. Acknowledgement is made of applicant's Election of claims 1-50 without traverse filed on April 20, 2006 in response to the Restriction requirement of the previous office action. Accordingly claims 51-55 have been cancelled. Claims 1-50 are currently pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-9, 13-15, 17, 22, 27-34, 41-43, 45 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US_5,883,388).

4. Claims 1 is rejected because:

A. Smith et al (Smith hereinafter) discloses a system comprising at least one imaging device 2 (see col.5, line 66) imaging a stone 3 and outputting a thermal map (see col.3, lines 8-10) of said stone 3, an image processing unit (see col.3, line 7; col.5, lines 10-11) utilizing said thermal map to determine regions having changed emission in said thermal map (see col.3, lines 8-18; col.5, lines 20-24), and an analyzing unit (see col.1, lines 56-57; col.5, lines 10-24, and specifically lines 10-11) detecting at least one imperfection in said stone from said regions of changed emission (see the last two lines of the abstract; col.6, lines 33-39) for the inspection of a precious stone 3 (see col.1, line 5; col.5, lines

59-67; Figure 1) to detect and/or locate any imperfection or defect in the stone and thereby determine the quality of said stone for valuation purposes.

B. However, Smith does not explicitly disclose an energy transfer system for changing the temperature of a precious stone for the inspection of the precious stone to detect and/or locate any imperfection or defect in the stone and thereby determine the quality of said stone for valuation purposes.

C. Smith discloses a heating means (col.6, lines 1-7) for changing the temperature of a precious stone for the inspection of the precious stone to detect and/or locate any imperfection or defect in the stone and thereby determines the quality of said stone for valuation purposes.

D. In view of Smith's teaching of the heating means, it would have been obvious to one of ordinary skill in the art that Smith's heating means is a functional equivalent of applicant's claimed energy transfer system because Smith's heating means does transfer heat energy from said heating means to a precious stone under inspection (and therefore it is an energy transfer system) and therefore a substitute means for changing the temperature of said precious stone to detect and/or locate any imperfection or defect in the stone from its thermal image and thereby determine the quality of said stone for valuation purposes.

Notes:

a) With regard to the limitation "thermal map" of claim 1, Smith does not use the exact terminology as recited in claim 1, but it is obvious to one of ordinary skill in the art that the Smith is referring to a thermal map where it

states "areas of different temperature range may be presented in different colors" (see col.3, lines 8-10).

b) With regard to the limitation "changed emission" of claim 1, "changed emission" is interpreted as the emission after the temperature has been changed. It should be noted that different materials have different emissivity at different temperatures.

c) With regard to the limitation "utilizing said thermal map to determine regions having changed emission in said thermal map," Smith discloses the thermal map in col.3, lines 8-10, and discloses an image processing unit such as a computer in col.5, lines 10-11, which utilizes said thermal map to determine regions/zones having changed emission in said thermal map by assigning different colors to areas/zones having different emissivity, as described in col.5, lines 20-24.

5. Claim 2 is rejected for the same reasons of rejection of claim 1 above, and additionally because Smith discloses determining a character of at least one imperfection (see col.1, lines 49-50 and lines 64-65) such as the characteristics of a deposited layer on the diamond/stone to detect differences between the compositions of different zones/locations/areas.

6. Claim 3 is rejected for the same reasons of rejection of claim 1 above, and additionally because Smith teaches of an energy transfer system comprising an energy source 6 such that said changing the temperature of the stone 3 comprises raising the temperature of the stone 3 above that of its environment (see col.3, lines 19-21 and col.6, lines 1-7).

7. Claim 4 is rejected for the same reasons of rejection of claim 1 above, and additionally because Smith teaches of lowering the temperature of the stone 3 (see col.3, lines 21-22) for thermal imaging to detect and locate any imperfection in the stone 3 to determine the quality of said stone for valuation purposes. In view of Smith's teaching of cooling the stone and heating

the background, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Smith's system comprises an energy transfer system comprising an energy sink such that said changing the temperature of the stone 3 comprises lowering the temperature of the stone below that of its environment (see col.3, lines 21-22) for thermal imaging to detect and locate any imperfection in the stone 3 from its thermal image to determine the quality of said stone for valuation purposes.

8. Claim 5 is rejected for the same reasons of rejection of claim 1 above, and additionally because Smith teaches of an imaging device 2 that images the stone 3 in the infrared region (see col.5, lines 59-63).

9. Claim 6 is rejected for the same reasons of rejection of claim 1 above, and additionally because Smith teaches that the imaging device is a camera 2 (see col.5, line 66).

10. Claim 7 is rejected for the same reasons of rejection of claim 1 above, and additionally because Smith teaches that regions of changed emission result from a change in temperature at said location from the temperature in the remainder of said stone (see col.3, lines 7-18 and col.4, lines 25-41).

11. Claims 8 and 9 are rejected for the same reasons of rejection of claim 1 above, and additionally because Smith teaches that the characteristics of said at least one imperfection in said stone is determined from the level of said changed emission (see col.4, lines 25-29).

12. Claim 13 is rejected for the same reasons of rejection of claims 1 and 3 above, and additionally because Smith teaches that the energy source for raising the temperature of said stone is a radiation source 6 (see col.6, lines 4-7).

13. Claim 14 is rejected for the same reasons of rejection of claims 1, 3 and 13 above, and additionally because Smith teaches that the radiation source emits infrared energy (see col.6, lines 4-7).

14. Claim 15 is rejected for the same reasons of rejection of claims 1, 3 and 13 above, and additionally because in view of Smith's teaching of pre-heating and placing the diamond a heated support (see col.3, lines 30-32), it would have been obvious to one of ordinary skill in the art at the time the invention was made to infer that the "heated support" is a hot plate or a functional equivalent of a hot plate, the diamond/stone placed in contact with (see col.3, line 31) said heated support for rapidly changing the temperature of the diamond/stone during the inspection so that more diamonds/stones can be inspected for imperfection or defect in a shorter period of time. Further, because the disclosure lacks any reasoning why a hot plate is critical for the heating of the stone or to the claimed invention, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any of the different types of heat-sources or holders for heating/cooling and holding the stone during inspection to detect and/or locate any imperfection in the stone for determining the quality of said stone for valuation purposes.

15. Claim 17 is rejected for the same reasons of rejection of claims 1, 3, 13 and 14 above, and additionally because Smith teaches that a filter is disposed between said stone 3 and said imaging device 2 (see col.3, lines 1-6 and specifically line 4), such that said stone is imaged at a wavelength bandwidth more limited than that of said radiation for selectively targeting any specific type of imperfection that has wavelength dependent transmission/reflection characteristics in the inspection of the precious stone to detect and/or locate the specific type of

imperfections or defects to improve the ability of the system to detect more imperfections and thereby determine the quality of said stone with improved accuracy for valuation purposes.

16. Claim 22 is rejected for the same reasons of rejection of claim 1 above, and additionally because Smith teaches that the stone is a diamond (see col.5 line 63).

17. Claim 27 is rejected because:

A. Smith discloses a method comprising the steps of imaging a stone 3 by means of at least one imaging device 2 (see col.5, line 66), outputting a thermal map (see col.3, lines 8-10) of said stone 3 from said at least one imaging device 2, image processing said thermal map (see col.3, line 7; col.5, lines 10-11) to determine regions of changed emission in said thermal map (see col.3, lines 8-18; col.5, lines 20-24), and analyzing (see col.1, lines 56-57; col.5, lines 10-24, and specifically lines 10-11) said regions of changed emission (see the last two lines of the abstract; col.6, lines 33-39) for detecting at least one imperfection in said stone 3 (see col.1, line 5; col.5, lines 59-67; Figure 1) in the inspection of a precious stone to determine the quality of said stone for valuation purposes.

B. However, Smith does not explicitly disclose changing the temperature of a precious stone with an energy transfer system for the inspection of the precious stone to detect and/or locate any imperfection or defect in the stone and thereby determine the quality of said stone for valuation purposes.

C. Smith discloses changing the temperature of a precious stone with a heating means (col.6, lines 1-7) for the inspection of the precious stone to detect and/or locate any imperfection

or defect in the stone and thereby determines the quality of said stone for valuation purposes.

D. In view of Smith's teachings, it would have been obvious to one of ordinary skill in the art at the time the invention was made that changing the temperature of the stone with Smith's heating means is functionally equivalent to changing the temperature of the stone with applicant's claimed energy transfer system because Smith's heating means does transfer heat energy from said heating means to a precious stone under inspection (and therefore it is an energy transfer system), for changing the temperature of said precious stone to detect and/or locate any imperfection or defect in the stone from a thermal image obtained of said stone and thereby determine the quality of said stone for valuation purposes.

18. Claim 28 is rejected for the same reasons of rejection of claim 27 above, and additionally because Smith discloses determining a character of at least one imperfection (see col.1, lines 49-50 and lines 64-65) such as the characteristics of a deposited layer on the diamond/stone to detect differences between the compositions of different zones/locations/areas.

19. Claim 29 is rejected for the same reasons of rejection of claim 27 above, and additionally because Smith teaches of an energy transfer system comprising an energy source 6 such that said changing the temperature of the stone 3 comprises raising the temperature of the stone 3 above that of its environment (see col.3, lines 19-21 and col.6, lines 1-7).

20. Claim 30 is rejected for the same reasons of rejection of claim 27 above, and additionally because Smith teaches of lowering the temperature of the stone 3 (see col.3, lines 21-22) for thermal imaging to detect and locate any imperfection in the stone 3 to determine the quality of

said stone for valuation purposes. In view of Smith's teaching of cooling the stone and heating the background, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Smith's system comprises an energy transfer system comprising an energy sink such that said changing the temperature of the stone 3 comprises lowering the temperature of the stone below that of its environment (see col.3, lines 21-22) for thermal imaging to detect and locate any imperfection in the stone 3 from its thermal image to determine the quality of said stone for valuation purposes.

21. Claim 31 is rejected for the same reasons of rejection of claim 27 above, and additionally because Smith teaches of an imaging device 2 that images the stone 3 in the infrared region (see col.5, lines 59-63).

22. Claim 32 is rejected for the same reasons of rejection of claim 27 above, and additionally because Smith teaches that the imaging device is a camera 2 (see col.5, line 66).

23. Claim 33 is rejected for the same reasons of rejection of claim 27 above, and additionally because Smith teaches that regions of changed emission result from a change in temperature at said location from the temperature in the remainder of said stone (see col.3, lines 7-18 and col.4, lines 25-41).

24. Claim 34 is rejected for the same reasons of rejection of claim 29 and additionally because from Smith's disclosure that the stone/diamond is pre-heated before placing it in the apparatus (see col.3, lines 30-32) for taking thermal images of it, it is obvious to one of ordinary skill in the art that the imaging step is performed after terminating said step of raising the temperature of said stone above that of its environment by means of the energy source.

25. Claim 41 is rejected for the same reasons of rejection of claims 27 and 29 above, and additionally because Smith teaches that the energy source for raising the temperature of said stone is a radiation source 6 (see col.6, lines 4-7).

26. Claim 42 is rejected for the same reasons of rejection of claims 27, 29 and 41 above, and additionally because in view of Smith's teaching of pre-heating and placing the diamond a heated support (see col.3, lines 30-32), it would have been obvious to one of ordinary skill in the art at the time the invention was made to infer that the "heated support" is a hot plate or a functional equivalent of a hot plate, the diamond/stone placed in contact with (see col.3, line 31) said heated support for rapidly changing the temperature of the diamond/stone during the inspection so that more diamonds/stones can be inspected for imperfection or defect in a shorter period of time. Further, because the disclosure lacks any reasoning why a hot plate is critical for the heating of the stone or to the claimed invention, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any of the different types of heat-sources or holders for heating/cooling and holding the stone during inspection to detect and/or locate any imperfection in the stone for determining the quality of said stone for valuation purposes.

27. Claim 43 is rejected for the same reasons of rejection of claims 27, 29 and 41 above, and additionally because Smith teaches that the radiation source emits infrared energy (see col.6, lines 4-7).

28. Claim 45 is rejected for the same reasons of rejection of claims 27, 29, 41 and 43 above, and additionally because Smith teaches that a filter is disposed between said stone 3 and said imaging device 2 (see col.3, lines 1-6 and specifically line 4), such that said stone is imaged at a

wavelength bandwidth more limited than that of said radiation for selectively targeting any specific type of imperfection that has wavelength dependent transmission/reflection characteristics in the inspection of the precious stone to detect and/or locate the specific type of imperfections or defects to improve the ability of the system to detect more imperfections and thereby determine the quality of said stone with improved accuracy for valuation purposes.

29. Claim 48 is rejected for the same reasons of rejection of claim 27 above, and additionally because Smith teaches that the stone is a diamond (see col.5 line 63).

30. Claims 10 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US_5,883,388) in view of Weiss et al (US_6,512,239 B1).

31. Claim 10 is rejected for the same reasons of rejection of claim 1 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above except that at least one imaging device is two imaging devices, such that the location of at least one imperfection in the stone is determined in three dimensions for mapping the quality of said stone for valuation purposes.

B. Weiss et al (Weiss hereinafter) teaches of an apparatus comprising two imaging devices 5, 6, (see col.4, lines 27-31) for locating, detecting and identifying defects in a transparent media such that the location of at least one defect/imperfection in the media is determined in three dimensions for mapping the quality of said transparent media for valuation purposes.

C. In view of Weiss's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Weiss's teaching into Smith's system due to the fact that such incorporation would provide an apparatus having an added feature of determining the defects in three dimensions for more accurately mapping the quality of the stone for valuation purposes.

32. Claim 38 is rejected for the same reasons of rejection of claim 27 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above except that the step of imaging said stone by means at least one imaging device is two imaging devices, such that the location of at least one imperfection in the stone is determined in three dimensions for mapping the quality of said stone for valuation purposes.

B. Weiss et al (Weiss hereinafter) teaches of a method comprising the step of imaging a transparent media with two imaging devices 5, 6, (see col.4, lines 27-31) for locating, detecting and identifying defects in said transparent media such that the location of at least one defect/imperfection in the media is determined in three dimensions for mapping the quality of said transparent media for valuation purposes.

C. In view of Weiss's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Weiss's teaching into Smith's system due to the fact that such incorporation would provide an apparatus having an added feature of determining the defects in three dimensions for more accurately mapping the quality of the stone for valuation purposes.

33. Claims 11, 12, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US_5,883,388) in view of McCroskey et al (US_5,023,895).

34. Claim 11 is rejected for the same reasons of rejection of claim 1 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above including angularly aligning the stone relative to the imaging device for imaging the stone in at least two directions (see col.2, lines 60-63) for mapping the quality of said stone for valuation purposes.

B. However, Smith does not explicitly teach of aligning the stone such that the location of at least one imperfection in said stone is determined in three dimensions for mapping the quality of said stone for valuation purposes.

C. McCroskey et al (McCroskey hereinafter) teach of aligning an object 25 relative to the imaging device 17 for imaging the object in at least two directions such that the location of at least one imperfection such as inclusions is determined in three dimensions (see abstract; col.8, line 45- col.9, line 28 and col.13, lines63-66) for mapping the quality of said stone for valuation purposes.

D. In view of McCroskey's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate McCroskey's teaching into Smith's system due to the fact that such incorporation would provide an apparatus having an added feature of determining the defects in three dimensions for more accurately mapping the quality of the stone for valuation purposes.

35. Claim 12 is rejected for the same reasons of rejection of claim 1 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above including angularly aligning the stone relative to the imaging device by means of a conventional mounting means 4 which allows the stone to be manipulated and moved with respect to the imaging device 2 to allow different views of the stone to be taken (see col.5, lines 63-67) for mapping the quality of said stone for valuation purposes.

B. However, Smith does not explicitly teach of stone is angularly realigned relative to said imaging device by means of a turntable on which said stone is mounted for mapping the quality of said stone for valuation purposes.

C. McCroskey teach of aligning an object 25 relative to an imaging device 17 wherein the object under inspection is mounted on a turntable 24 on which said stone is mounted for imaging the object in at least two directions such that the location of at least one imperfection such as inclusions is determined in three dimensions (see abstract; col.8, line 45- col.9, line 28 and col.13, lines 63-66) for mapping the quality of said stone for valuation purposes.

D. In view of McCroskey's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate McCroskey's teaching into Smith's system due to the fact that such incorporation would provide an apparatus having a turntable for more accurately realign and position the stone/diamond relative to the imaging device under inspection and thereby improve the overall accuracy of the system for determining the defects in three dimensions and mapping the quality of the stone for valuation purposes.

36. Claim 39 is rejected for the same reasons of rejection of claim 27 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above including angularly aligning the stone relative to the imaging device for imaging the stone in at least two directions (see col.2, lines 60-63) for mapping the quality of said stone for valuation purposes.

B. However, Smith does not explicitly teach of aligning the stone such that the location of at least one imperfection in said stone is determined in three dimensions for mapping the quality of said stone for valuation purposes.

C. McCroskey et al (McCroskey hereinafter) teach of aligning an object 25 relative to the imaging device 17 for imaging the object in at least two directions such that the location of at least one imperfection such as inclusions is determined in three dimensions (see abstract; col.8, line 45- col.9, line 28 and col.13, lines63-66) for mapping the quality of said stone for valuation purposes.

D. In view of McCroskey's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate McCroskey's teaching into Smith's system due to the fact that such incorporation would provide an apparatus having an added feature of determining the defects in three dimensions for more accurately mapping the quality of the stone for valuation purposes.

37. Claim 40 is rejected for the same reasons of rejection of claim 27 and 39 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above including angularly aligning the stone relative to the imaging device by means of a conventional mounting means 4 which allows

the stone to be manipulated and moved with respect to the imaging device 2 to allow different views of the stone to be taken (see col.5, lines 63-67) for mapping the quality of said stone for valuation purposes.

B. However, Smith does not explicitly teach of providing a turntable and that the stone is angularly realigned relative to said imaging device by means of a turntable on which said stone is mounted for mapping the quality of said stone for valuation purposes.

C. McCroskey teach of aligning an object 25 relative to an imaging device 17 wherein the object under inspection is mounted on a turntable 24 on which said stone is mounted for imaging the object in at least two directions such that the location of at least one imperfection such as inclusions is determined in three dimensions (see abstract; col.8, line 45- col.9, line 28 and col.13, lines 63-66) for mapping the quality of said stone for valuation purposes.

D. In view of McCroskey's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate McCroskey's teaching into Smith's system due to the fact that such incorporation would provide an apparatus having a turntable for more accurately realign and position the stone/diamond relative to the imaging device under inspection and thereby improve the overall accuracy of the system for determining the defects in three dimensions and mapping the quality of the stone for valuation purposes.

38. Claims 16, 18-19, 35, 44 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US_5,883,388) in view of Spear et al (US_5,883,389).

39. Claims 16 and 44 are rejected for the same reasons of rejection of claims 14 and 44 respectively, and additionally because:

A. Smith teaches all claim limitations as disclosed above except that the system comprises a filter disposed between the radiation source 6 and said stone 3, such that said stone is irradiated with energy having a more limited wavelength bandwidth than the imaging bandwidth for selectively targeting any specific type of imperfection that has wavelength dependent transmission/reflection characteristics, in the inspection of the precious stone to detect and/or locate the specific type of imperfection or defect in the stone and thereby determine the quality of said stone for valuation purposes.

B. Spear et al (Spear hereinafter) discloses a filter 21 disposed between the radiation source 5 and a stone 1 under test (see col.6, lines 55-67 and Figure 1), such that said stone is irradiated with energy having a more limited wavelength bandwidth than the imaging bandwidth for selective targeting of specific type of imperfection that has wavelength dependent transmission/reflection characteristics, to improve the ability of the system to detect more imperfections with improved accuracy for determining the quality of said stone for valuation purposes.

C. In view of Spear's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Spear's teaching into Smith's system due to the fact that such incorporation would provide selective targeting of specific type of imperfection that has wavelength dependent transmission/reflection characteristics, to improve the ability of the system to detect more imperfections with improved accuracy for determining the quality of said stone for valuation purposes.

40. Claims 18 and 46 are rejected for the same reasons of rejection of claims 16 and 44 respectively, and additionally because Spear's system comprises a filter 21 that is operative to reduce the effect of reflections of the energy from the radiation source on the images of the stone (see col.6, lines 55-67). In view of Spear's teaching of a filter 21 that is operative to reduce the effect of reflections of the energy from the radiation source on the images of the stone (see col.6, lines 55-67), it would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose Spear's teaching of reflection-reducing filter between the stone and the imaging device to reduce the effect of reflections of the energy from the radiation source on the images of the stone and to reduce any noise due to undesired wavelength(s) of light incident on the imaging device for improving accuracy of the detection of imperfection in the stone for determining the quality of said stone for valuation purposes.

41. Claim 19 is rejected for the same reasons of rejection of claim 17 above, and because in view of Spear's teaching of a filter 21 that is operative to reduce the effect of reflections of the energy from the radiation source on the images of the stone (see col.6, lines 55-67), it would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose Spear's teaching of reflection-reducing filter between the stone and the imaging device to reduce the effect of reflections of the energy from the radiation source on the images of the stone and to reduce any noise due to undesired wavelength(s) of light incident on the imaging device for improving accuracy of the detection of imperfection in the stone for determining the quality of said stone for valuation purposes.

42. Claim 35 is rejected for the same reasons of rejection of claim 34 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above except that the system comprises the step of terminating the raising of the temperature of said stone is performed by means of a shutter, in the inspection of the stone to detect and/or imperfection or defect in the stone to determine the quality of said stone for valuation purposes.

B. Spear discloses a step of terminating the raising of the temperature of said stone performed by means of a shutter 41 (see col.7, line 65- col.8, line 3), in the inspection of the stone to detect and/or imperfection or defect in the stone to determine the quality of said stone for valuation purposes.

C. In view of Spear's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Spear's teaching into Smith's system due to the fact that such incorporation would provide a more precise control of heat transfer to the stone for better thermal imaging, to improve the ability of the system to detect more imperfections with improved accuracy in determining the quality of said stone for valuation purposes.

43. Claims 20 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US_5,883,388) in view of Nonaka et al (US_5,834,661).

44. Claims 20 and 47 are rejected for the same reasons of rejection of claims 4 and 30 respectively, and additionally because:

A. Smith teaches all claim limitations as disclosed above except for a thermoelectric energy sink for lowering the temperature of said precious stone to detect any imperfection in the stone to determine the quality of said stone for valuation purposes.

B. Nonaka et al (Nonaka hereinafter) teaches of a thermoelectric energy transfer device 2 (see col.2, lines 60-66 and specifically line 66; Figure 1) for lowering the temperature of an object under inspection to detect any imperfection in said object for evaluating the quality of said object.

C. In view of Nonaka's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Nonaka's thermoelectric cooling device into Smith's apparatus to cool the stone because defects that are not detectable when the stone is at higher temperature can be detected when said stone is at a lower temperature, to detect any imperfection in the stone to determine the quality of said stone for valuation purposes.

45. Claims 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US_5,883,388) in view of Smith et al (US_5,811,824).

46. Claim 21 is rejected for the same reasons of rejection of claim 1 above, and additionally because:

A. Smith teaches all claim limitations as disclosed above except for a pair of polarizing elements, at least one element being located between said energy source and said stone, and at least another element being located between said stone and said imaging device to detect any imperfection in the stone to determine the quality of said stone for valuation purposes.

B. Smith et al ('824 patent hereinafter) teaches of a pair of polarizing elements, at least one element being located between said energy source and said stone, and at least another

element being located between said stone and said imaging device (see col.2, lines 54-56) to minimize any scattered reflections from entering into the imaging system for detecting any imperfection in the stone for evaluating the quality of the stone.

C. In view of teaching of the '824 patent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the polarizing filters into Smith's apparatus to minimize any scattered reflections from entering into the imaging system to improve the signal to noise ratio and thereby make the apparatus more accurate in the detection of any imperfection in the stone to determine the quality of said stone for valuation purposes.

47. Claims 23, 24, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US_5,883,388) in view of Bowley et al (US_4,900,147).

48. Claims 23 and 49 are rejected for the same reasons of rejection of claims 1 and 27 respectively, and additionally because:

A. Smith teaches all claim limitations as disclosed above except for explicitly stating that the imperfection is an inclusion, in the detection of any imperfection in the stone to determine the quality of said stone for valuation purposes.

B. Bowley et al (Bowley hereinafter) teaches of imaging and mapping inclusion in diamonds (see col.4, lines 19-22) in the detection of any imperfection in the diamond for evaluating the quality of the diamond.

C. In view of Bowley's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Bowley's teaching into Smith's

apparatus due to the fact that it would provide an apparatus that can detect one more type of defect such as an inclusion, and thereby increase the capability of the apparatus for more accurately detecting any imperfection in the stone/diamond to determine the quality of said stone/diamond for valuation purposes.

49. Claims 24 and 50 are rejected for the same reasons of rejection of claims 1 and 27 respectively, and additionally because:

A. Smith teaches all claim limitations as disclosed above except for explicitly stating that the imperfection is an internal structural flaw, in the detection of any imperfection in the stone to determine the quality of said stone for valuation purposes.

B. Bowley et al (Bowley hereinafter) teaches of imaging and mapping internal structural flaw in diamonds (see col.4, lines 49-68, and specifically lines 66-68) in the detection of any imperfection in the diamond for evaluating the quality of the diamond.

C. In view of Bowley's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Bowley's teaching into Smith's apparatus due to the fact that it would provide an apparatus that can detect one more type of defect such as an internal structural flaw, and thereby increase the capability of the apparatus for more accurately detecting any imperfection in the stone/diamond to determine the quality of said stone/diamond for valuation purposes.

Allowable Subject Matter

50. Claims 25, 26, 36 and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

51. Claim 25 is allowable because prior art does not disclose a system for the inspection of a precious stone comprising, the imaging device generating successive images of a stone at different temperatures and at a fixed wavelength to determine the characteristics of a detected imperfection in the stone, in combination with the rest of the limitations of claim 25 and its parent claim, claim 1.

52. Claim 26 is allowable because prior art does not disclose a system for the inspection of a precious stone comprising, the imaging device generating successive images of a stone at different wavelengths and at a fixed temperature to determine the characteristics of a detected imperfection in the stone, in combination with the rest of the limitations of claim 26 and its parent claim, claim 1.

53. Claim 36 is allowable because prior art does not disclose a method for the inspection of a precious stone comprising the step of transferring energy to the stone is by means of at least one pulse, in combination with the rest of the limitations of claim 36 and its parent claims, claims 27, 29 and 34.

54. Claim 37 is allowable because prior art does not disclose a method for the inspection of a precious stone comprising the step of imaging performed while said step of changing the

temperature of the stone is continued, in combination with the rest of the limitations of claim 37 and its parent claim, claim 27.

Contact/Status Information

55. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Roy M. Punnoose** whose telephone number is **571-272-2427.** The examiner can normally be reached on 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Gregory J. Toatley, Jr.** can be reached on **571-272-2800 ext.77.** The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

May 01, 2006

Roy M. Punnoose
Patent Examiner
Art Unit 2877